

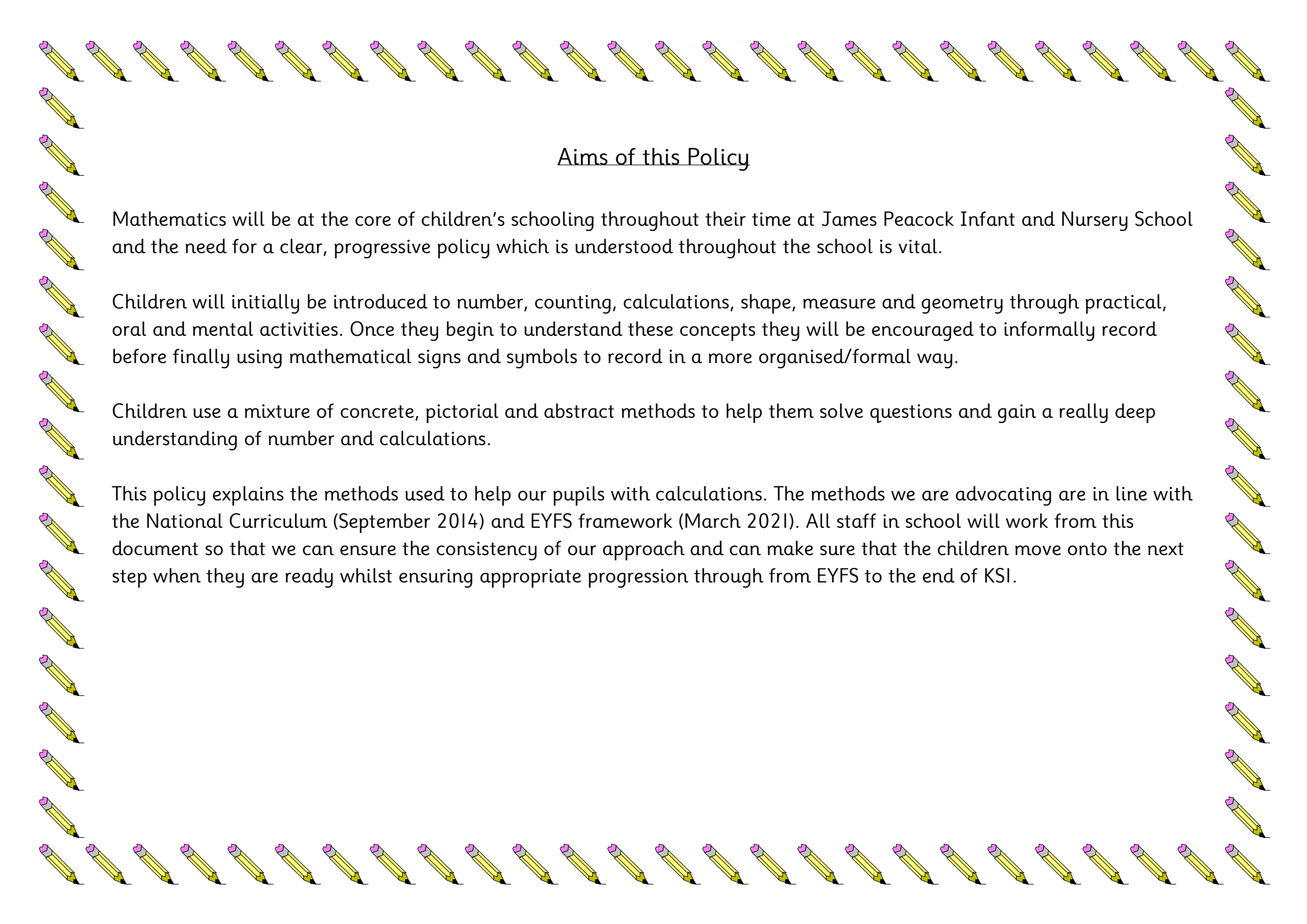


James Peacock

Infant and Nursery

School Calculation

Policy



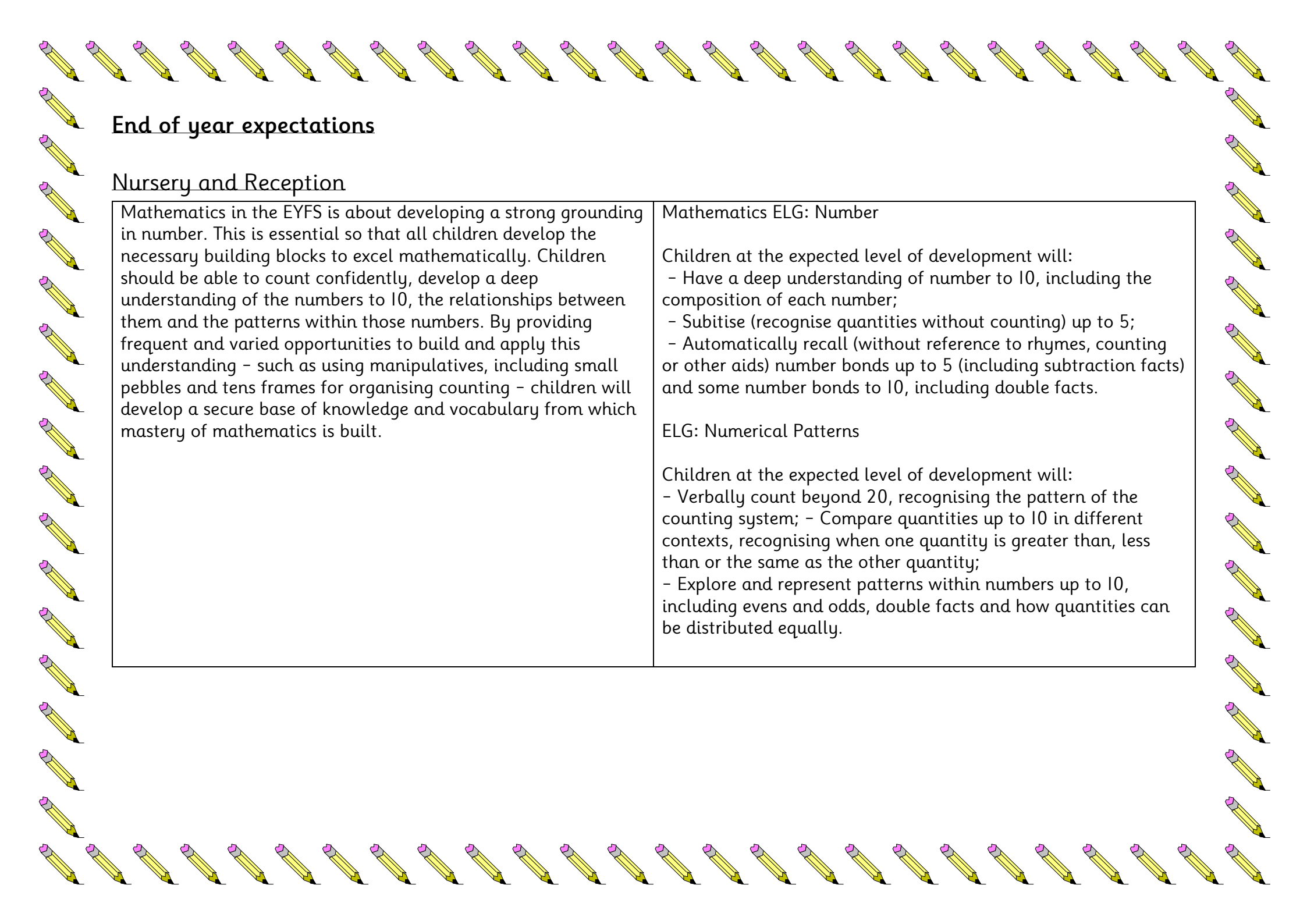
## Aims of this Policy

Mathematics will be at the core of children's schooling throughout their time at James Peacock Infant and Nursery School and the need for a clear, progressive policy which is understood throughout the school is vital.

Children will initially be introduced to number, counting, calculations, shape, measure and geometry through practical, oral and mental activities. Once they begin to understand these concepts they will be encouraged to informally record before finally using mathematical signs and symbols to record in a more organised/formal way.

Children use a mixture of concrete, pictorial and abstract methods to help them solve questions and gain a really deep understanding of number and calculations.

This policy explains the methods used to help our pupils with calculations. The methods we are advocating are in line with the National Curriculum (September 2014) and EYFS framework (March 2021). All staff in school will work from this document so that we can ensure the consistency of our approach and can make sure that the children move onto the next step when they are ready whilst ensuring appropriate progression through from EYFS to the end of KSI.



## End of year expectations

### Nursery and Reception

Mathematics in the EYFS is about developing a strong grounding in number. This is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding – such as using manipulatives, including small pebbles and tens frames for organising counting – children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built.

#### Mathematics ELG: Number

Children at the expected level of development will:

- Have a deep understanding of number to 10, including the composition of each number;
- Subitise (recognise quantities without counting) up to 5;
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

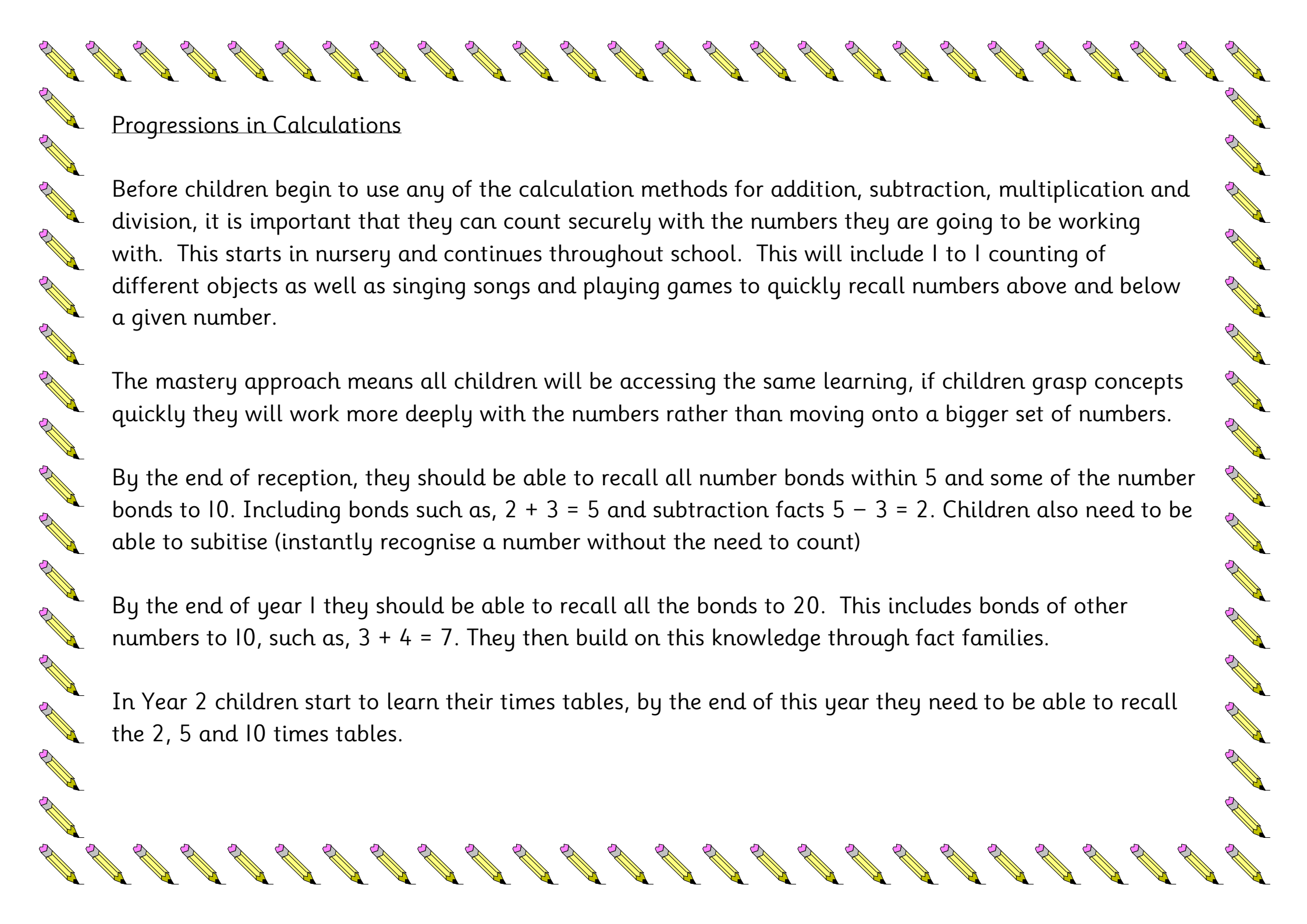
#### ELG: Numerical Patterns

Children at the expected level of development will:

- Verbally count beyond 20, recognising the pattern of the counting system;
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Year 1	Year 2
<ul style="list-style-type: none"> <li>• read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</li> <li>• represent and use number bonds and related subtraction facts within 20</li> <li>• add and subtract one-digit and two-digit numbers to 20, including zero</li> <li>• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = ? - 9</math>.</li> <li>• solve one-step problems involving multiplication and division, by calculating the answer using concrete objects</li> <li>• solve one-step problems involving multiplication and division using pictorial representations and arrays with the support of the teacher</li> </ul>	<ul style="list-style-type: none"> <li>• solve problems with addition and subtraction:               <ul style="list-style-type: none"> <li>• using concrete objects and pictorial representations, including those involving numbers, quantities and measures</li> <li>• applying their increasing knowledge of mental and written methods</li> <li>• recall and use addition and subtraction facts to 20 fluently</li> <li>• derive and use related facts up to 100</li> <li>• add and subtract numbers using concrete objects, pictorial representations, and mentally, including:                   <ul style="list-style-type: none"> <li>• a two-digit number and ones</li> <li>• a two-digit number and tens</li> <li>• two two-digit numbers</li> <li>• adding three one-digit numbers</li> </ul> </li> <li>• show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot</li> <li>• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems</li> <li>• recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers</li> <li>• calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs</li> <li>• show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot</li> <li>• solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts</li> </ul> </li> </ul>





## Progressions in Calculations

Before children begin to use any of the calculation methods for addition, subtraction, multiplication and division, it is important that they can count securely with the numbers they are going to be working with. This starts in nursery and continues throughout school. This will include 1 to 1 counting of different objects as well as singing songs and playing games to quickly recall numbers above and below a given number.

The mastery approach means all children will be accessing the same learning, if children grasp concepts quickly they will work more deeply with the numbers rather than moving onto a bigger set of numbers.

By the end of reception, they should be able to recall all number bonds within 5 and some of the number bonds to 10. Including bonds such as,  $2 + 3 = 5$  and subtraction facts  $5 - 3 = 2$ . Children also need to be able to subitise (instantly recognise a number without the need to count)

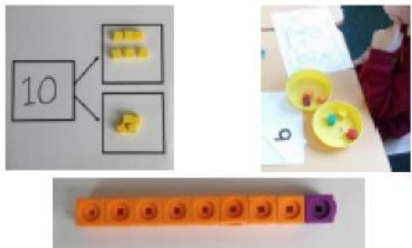
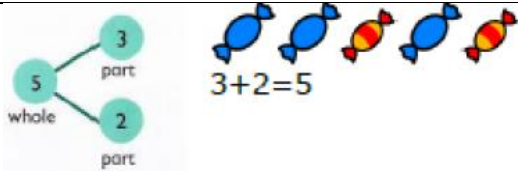
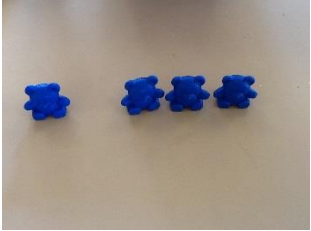

By the end of year 1 they should be able to recall all the bonds to 20. This includes bonds of other numbers to 10, such as,  $3 + 4 = 7$ . They then build on this knowledge through fact families.

In Year 2 children start to learn their times tables, by the end of this year they need to be able to recall the 2, 5 and 10 times tables.

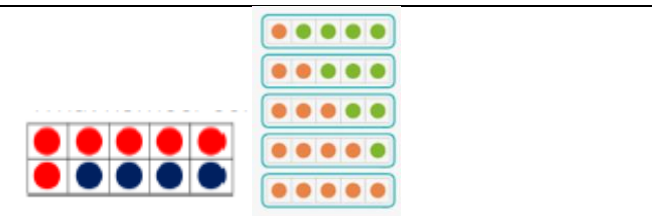
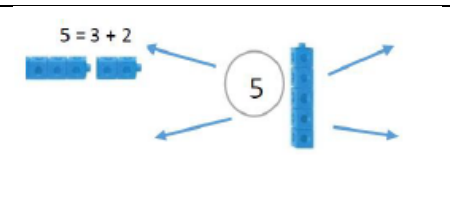
# Addition

## EYFS – Nursery and Reception

During the EYFS years children will build up to working with the numbers to 10.

Key Learning	Concrete	Pictorial	Abstract
Understanding the composition of numbers.			$3 + 2 = 5$ Mental recall of number bonds. Eg $1 + 4 = 5$
Find 1 more than a number		 <p>How many would I have if I had 1 more?</p>	Use the number line with the pictures so children can find the next number.

Number bonds



$$6 + 4 = 10$$

Adding by counting on



How many tractors are there in total?

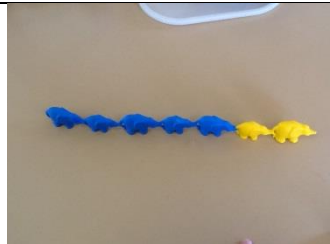


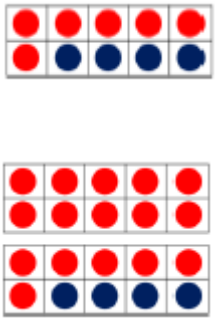
Two groups of tractor icons: a group of 6 tractors and a group of 3 tractors.

$$\boxed{6} + \boxed{\phantom{00}} = \boxed{\phantom{00}}$$

$$6 + 3 = 9$$

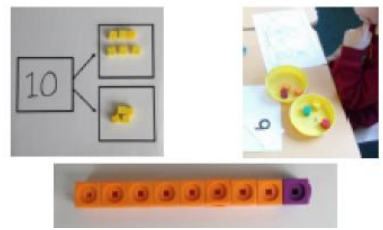
# Year 1

When children are drawing base 10 to help with calculations they will draw a I for to 10's and ... for the ones. Eg 23 III ...

Key Learning	Concrete	Pictorial	Abstract
Fact Families			$\_ + \_ = 7$ $\_ + \_ = 7$ $7 = \_ + \_$ $7 = \_ + \_$
Number bonds			$6 + 4 = 10$  $16 + 4 = 20$



Combining two groups to make a whole.



$3 + 2 = 5$

$8 + 1 = 9$

$3 + 2 = 5$   
 $8 + 1 = 9$

Mental recall of number bonds.  
 Eg  $3 + 4 = 7$

Counting on

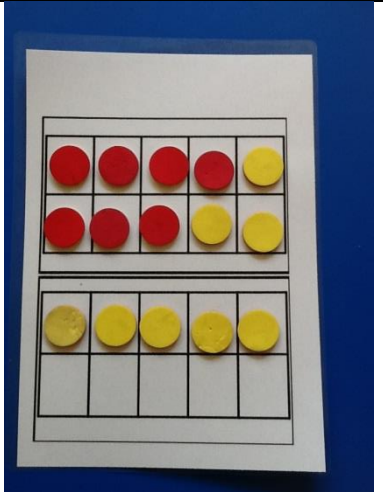


How many tractors are there in total?

$6 + \square = \square$

Jo has 13 prize tokens.  
 She wins 5 more.  
 How many prize tokens does Jo have now?  
 Show your calculation on the number line.

Add by making 10



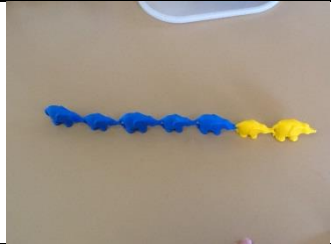
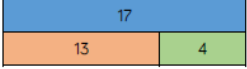
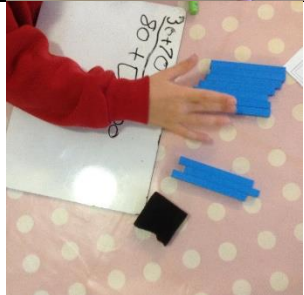
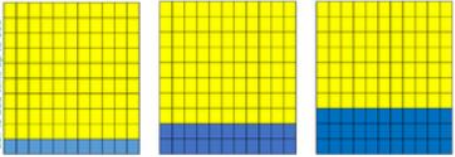
$7 + 8 = 15$   
 $7 + 3 = 10$   
 $10 + 5 = 15$

$6 + 4 = 10$   
 $10 + 3 = 13$

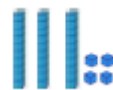
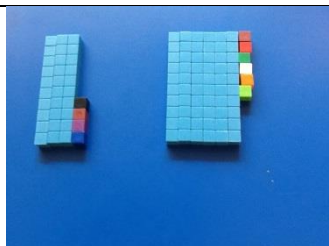
## Year 2

When children are drawing base 10 to help with calculations they will draw a I for to 10's and \_ for the ones.

Eg 23 III \_ \_ \_

Key Learning	Concrete	Pictorial	Abstract
Fact Families		<p>Look at the bar model below. Can you write all of the sentences in the fact family?</p> 	$13 + 4 =$ $4 + 13 =$
Number bonds to 100 (10's)			$40 + 60 = 100$ $60 + 40 = 100$

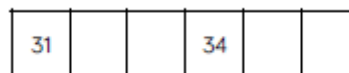
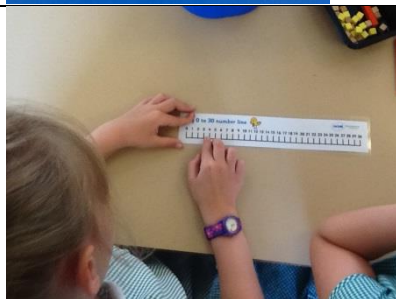
Number bonds to 100



Children add the base 10 to make 100 altogether. Encourage them to see the bond to 10.

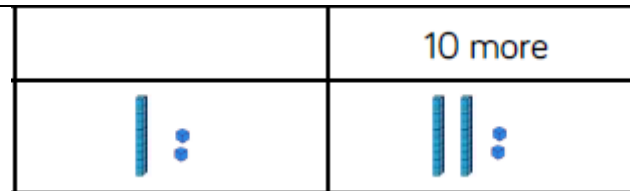
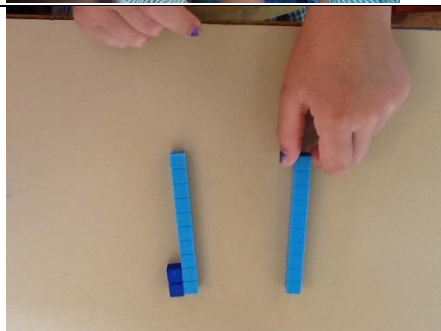
$$34 + \_ = 100$$

Add ones

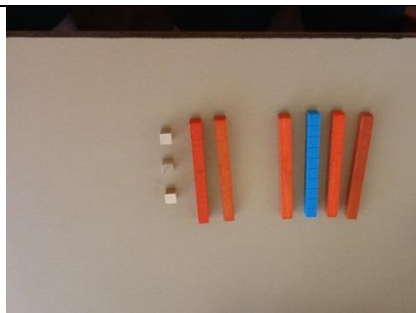


$$31 + 1 =$$

Add tens



$$12 + 10 = 22$$



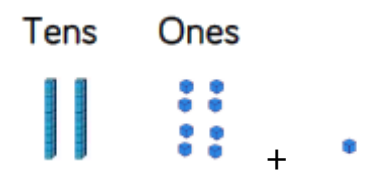
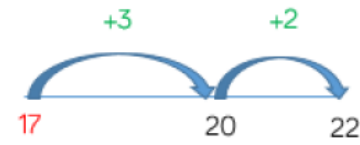
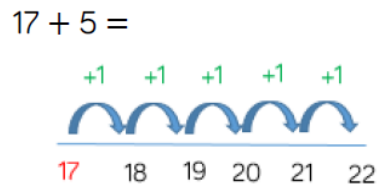
Tens	Ones

$$23 + 40 = 63$$

Summer Term

$$\begin{array}{r} 23 \\ + 40 \\ \hline \end{array}$$

Add 2 digit and 1 digit numbers

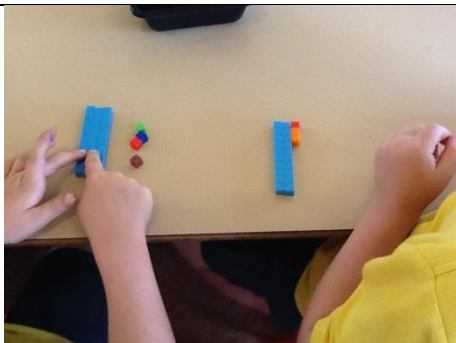


$$17 + 5 =$$

$$17 + 5 =$$

$$28 + 1 = 29$$

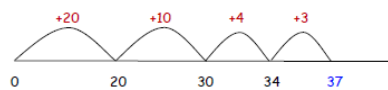
Add 2 2digit numbers not crossing 10



Find the sum of 34 and 23

$$\begin{array}{r} \text{|||} \text{::} \\ + \text{||} \text{:} \\ \hline \end{array}$$

$$\begin{array}{r} 13 + 24 = 37 \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 10 \quad 3 \quad 20 \quad 4 \end{array}$$

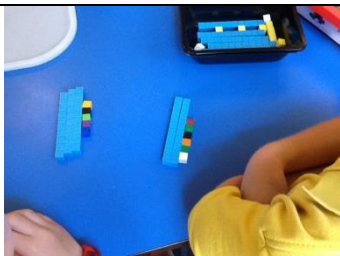


$$34 + 23 =$$

Confident by the Summer Term

$$\begin{array}{r} \text{TO} \\ 34 \\ +23 \end{array}$$

Add 2 2 digit numbers crossing 10

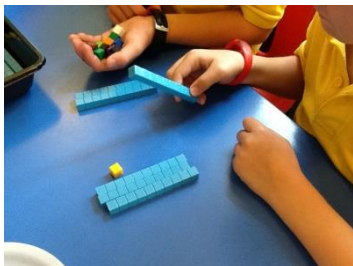


$$\begin{array}{r} \text{|||} \text{:} \\ + \text{||} \text{:} \\ \hline \end{array}$$

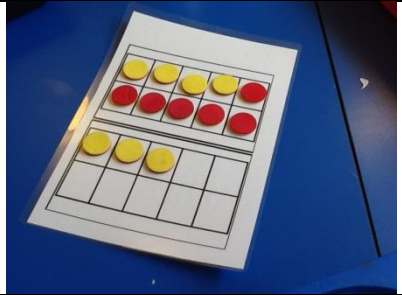
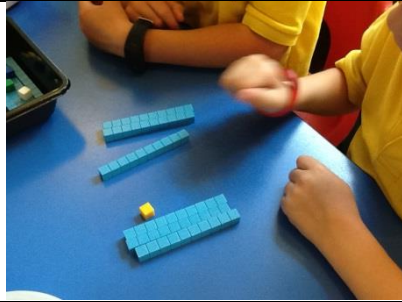
Children will make a group of 10 by exchanging 10 ones for a group of 10.

$$35 + 26 =$$

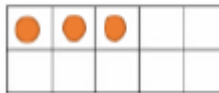
Confident Summer Term

$$\begin{array}{r} \text{TO} \\ 35 \\ +26 \end{array}$$






$$4 + 6 = 10$$





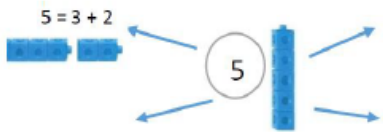

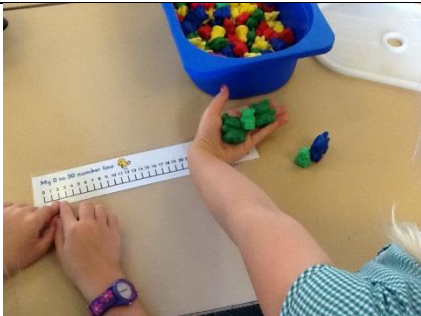

$$10 + 3 = 13$$

$$4 + 3 + 6$$



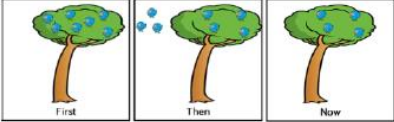
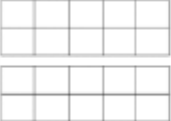
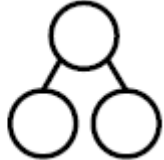
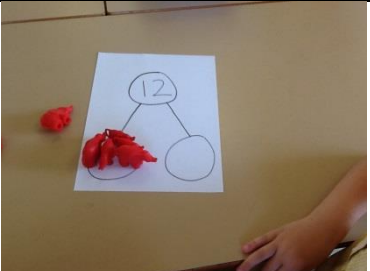
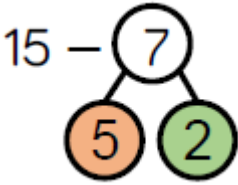
Adding three 1 digit numbers

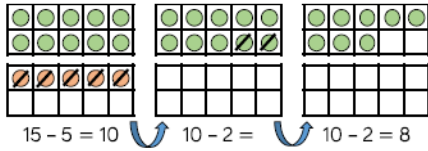
# Subtraction

## EYFS – Nursery and Reception

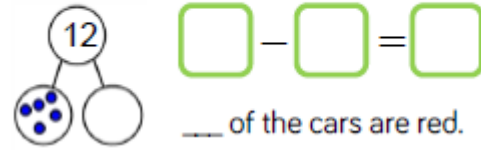
Key Learning	Concrete	Pictorial	Abstract
Find 1 less than a number		 <p>How many would I have if I had 1 less</p>	Use the number line with the pictures so children can find the previous number.
Number bonds	$5 = 3 + 2$  $5 - 2 = 3$		$10 - 4 = 6$
Taking away by counting back			Link the objects/pictures to the number line so that they can see it is going back.

# Year 1

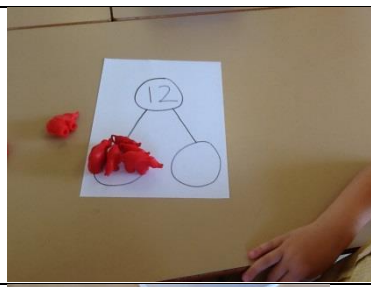
Key Learning	Concrete	Pictorial	Abstract
How many left?		<p>Complete the number sentence</p> <p></p> <p><input type="text" value="7"/> - <input type="text" value="2"/> = <input type="text"/></p> <p>There were 7 birds in a tree and 3 fly away.</p> 	<p><math>7 - 3 = 4</math></p> <p>Tom has 9 toy cars. He gives 5 of them away. How many does he have left?</p> <p><input type="text"/> - <input type="text"/> = <input type="text"/></p>
Subtraction – not crossing 10	<p>First there were 18 sheep. Four of them ran away. How many sheep are left?</p> <p>Use ten frames and counters to represent the sheep.</p>	 	<p><math>18 - 4 =</math></p>
Subtraction – crossing 10			<p><math>15 - 7 =</math></p> <p><math>15 - 5 = 10</math></p> <p><math>10 - 2 = 8</math></p>



There are 12 red and blue cars in the car park.  
5 of them are blue. How many are red?



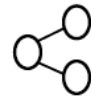
Breaking  
apart



How many dogs do not have spots?

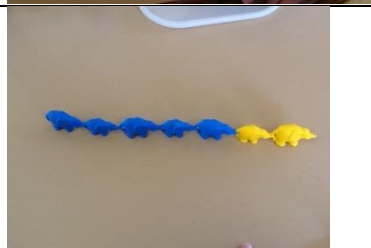


There are \_\_\_ dogs that do not have spots.



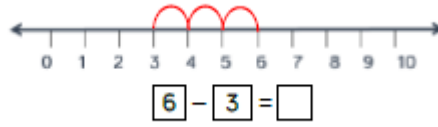
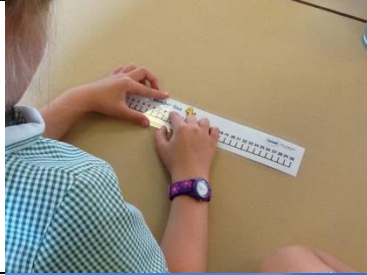
$$\boxed{6} - \boxed{2} = \boxed{\phantom{00}}$$

Fact  
Families



$$\begin{aligned} 7 - 2 &= 5 \\ 7 - 5 &= 2 \\ 2 &= 7 - 5 \\ 5 &= 7 - 2 \end{aligned}$$

Counting  
Back



$$6 - 3 =$$

Finding the  
difference



What's the difference between 10 and 6?

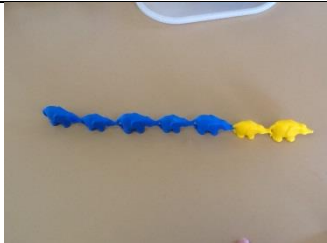
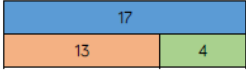
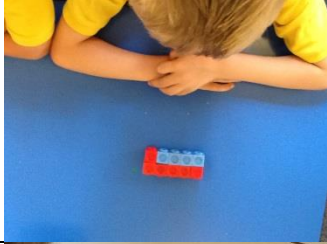
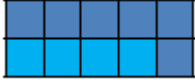
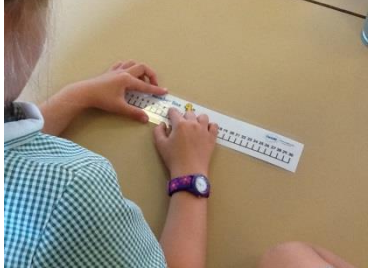
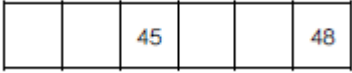


The difference between 10 and 6 is \_\_\_

$$10 - 6 =$$



# Year 2

Key Learning	Concrete	Pictorial	Abstract
Fact Families		<p>Look at the bar model below. Can you write all of the sentences in the fact family?</p> 	$17 - 13 = 4$ $17 - 4 = 13$
Number bonds to 100 (10's)			$100 - 40 = 60$ $100 - 60 = 40$
1 less			$45 - 1 = 44$

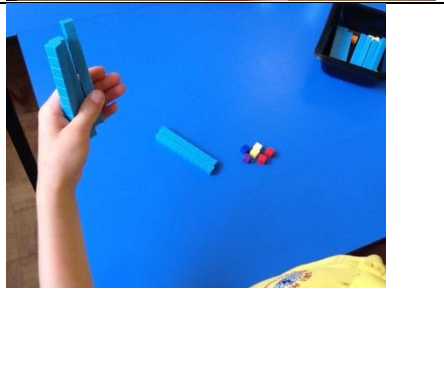
10 less



10 less	
2	12

$$12 - 10 = 2$$

Take away 10's



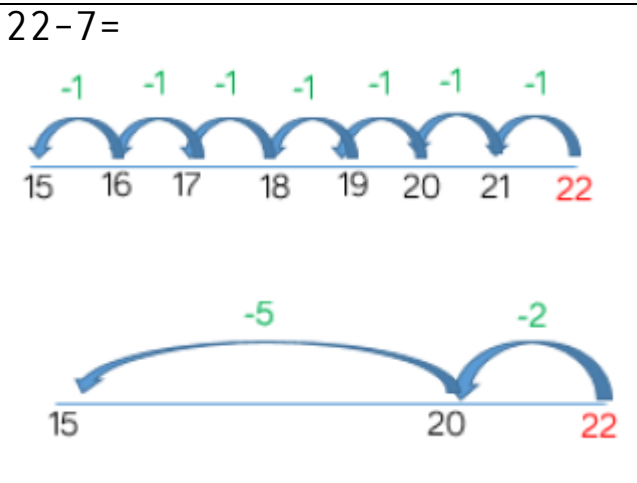
Tens	Ones

$$56 - 30 = 26$$

Confident by  
Summer Term

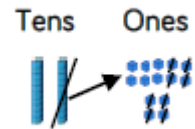
$$\begin{array}{r} 56 \\ -30 \\ \hline \end{array}$$

Subtract 1 digit number from a 2 digit number



$$22 - 7 = 15$$

$$22 - 7 = 15$$



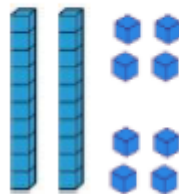
Children exchange 1 stick of 10 for 10 ones so they can take the 8 away

$$24 - 8 = 16$$

Subtract 2 digit number from a 2 digit number  
- no exchanging



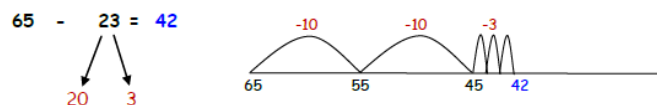
Subtract 13 from 28



Children cross off the ones and then the tens

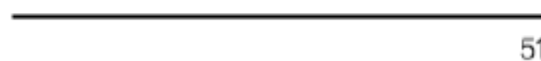
$$28 - 13 = 15$$

$$\begin{array}{r} \text{T O} \\ 28 \\ - 13 \\ \hline \end{array}$$

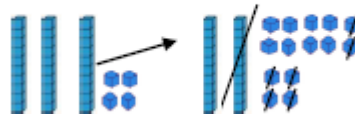


Subtract 2 digit number from a 2 digit number  
- with exchanging

Use the number line to subtract 12 from 51.



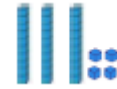
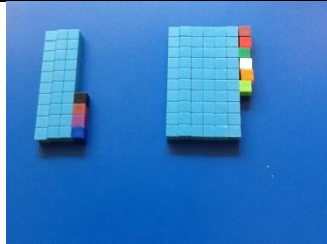
Take 16 away from 34



$$51 - 12 = 39$$

$$34 - 16 = 18$$

Number bonds  
to 100



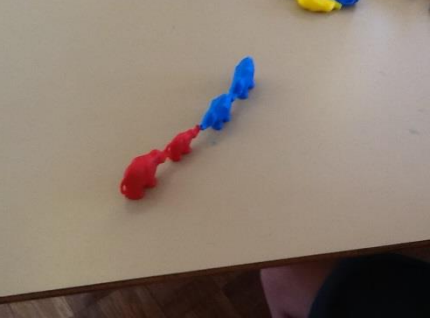
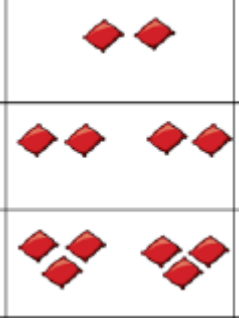
Children add the base 10 to make 100 altogether.  
Encourage them to see the bond to 10.

$$100 - \text{---} =$$
$$34$$


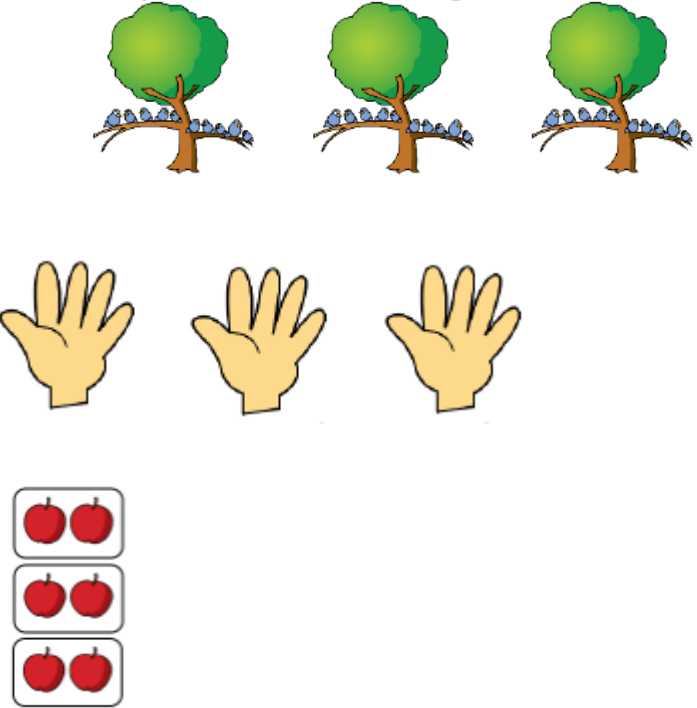


# Multiplication

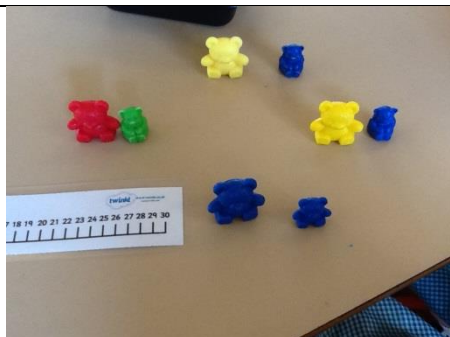
## EYFS – Nursery and Reception


Key Learning	Concrete	Pictorial	Abstract
Doubling			Record/find the number they have made  Build to $2 + 2 = 4$


# Year 1

Key Learning	Concrete	Pictorial	Abstract
Count in 10's, 5s and 2s		<p>How many birds are there altogether?</p> 	10 20 30 5, 10, 15, 20 2, 4, 6, 8, 10

Make equal groups



 There are \_\_\_ groups of \_\_\_ pencils.


 There are \_\_\_ groups of \_\_\_ flowers.

4 group of 5 pencils

Add equal groups



How many fingers altogether?



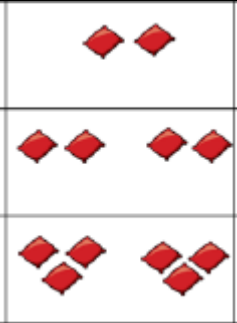
$5 + 5 + 5 =$

Make arrays



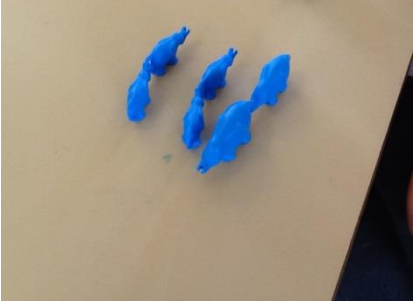




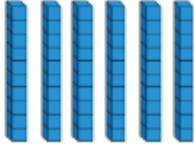
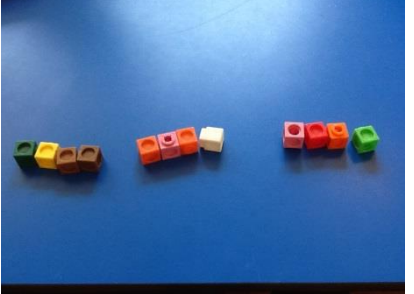



$2 + 2 + 2 = 6$   
 $3 + 3 = 6$

Doubles



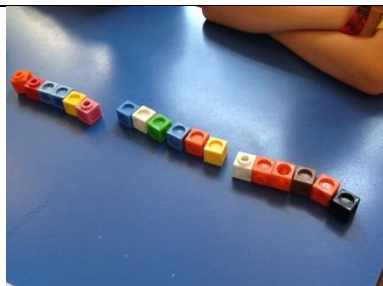
$$2 + 2 = 4$$


# Year 2

Key Learning	Concrete	Pictorial	Abstract
Recognise equal groups		<p>Complete the stem sentence.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid orange; padding: 5px; display: inline-block;">  </div> <div style="border: 1px solid orange; padding: 5px; display: inline-block;">  </div> <div style="border: 1px solid orange; padding: 5px; display: inline-block;">  </div> </div> <p>There are ____ equal groups with ____ in each group.</p>	3 equal groups with 2 in each group.
Make equal groups		<p>How else can you make these groups?</p> <p>The image below shows six equal groups with ten in each group. There are six 10s.</p> <div style="text-align: center;">  </div>	6 groups of 10
Add equal groups		<div style="display: flex; justify-content: space-around;">    </div>	$4 + 4 + 4 =$



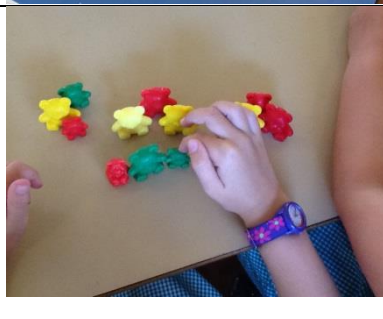
The x symbol




Complete the sentences to describe the equal groups.  

 $\square + \square + \square = 18$   
 $\square \times \square = 18$

$\square + \square + \square = 18$   
 $\square \times \square = 18$

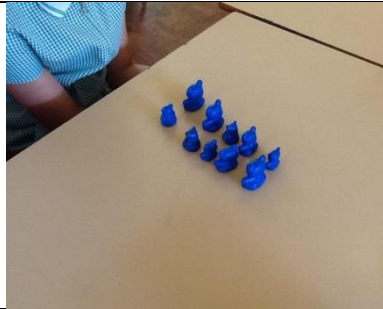
X from pictures




  
 $\square \times \square =$   
 $\square$  lots of 3 =  $\square$   
 $\square$  multiplied by  $\square = 12$

$4 \times 3 = 12$

Use arrays




On the image, find  $2 \times 5$  and  $5 \times 2$   


$2 \times 5 =$   
 $5 \times 2 =$

X 2



Count in 2s to calculate how many eyes there are.

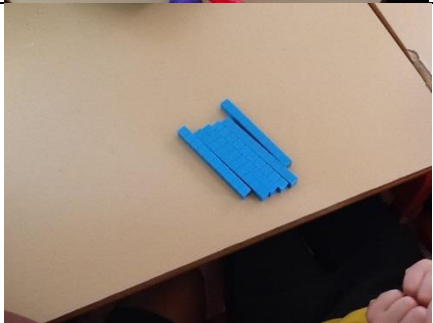



There are  eyes in total.

×  =

$4 \times 2 = 8$

X 10

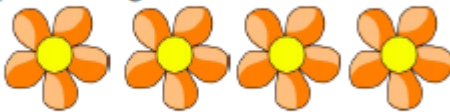
× 10 =

$6 \times 10 = 60$

X 5



How many petals altogether?





Write the calculation.





$4 \times 5 = 20$

# Division


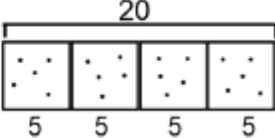

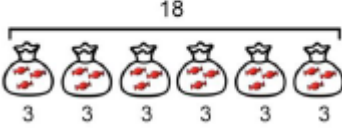
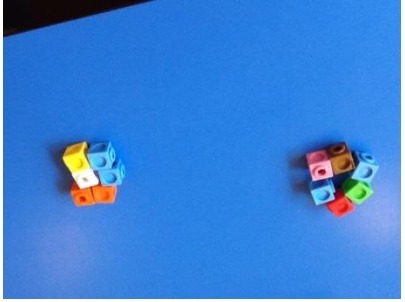

## EYFS – Nursery and Reception

Key Learning	Concrete	Pictorial	Abstract
Sharing objects equally (halving)			

# Year 1

Key Learning	Concrete	Pictorial	Abstract
Sharing equally		<p>Share the muffins equally between the two plates. Complete the sentence ___ cakes shared equally between 2 is ___</p> 	
Making equal groups		<p>How many equal groups of 2 can you make with the mittens?</p> 	<p>There are ___ groups of 2 mitten If you had 10 mittens, how many equal groups of 2 mittens could you make?</p>

# Year 2

Key Learning	Concrete	Pictorial	Abstract
<p>Make equal groups - sharing</p>	<p>Practically share the 12 cubes into the two boxes.</p> <p>There are ___ cubes altogether. There are ___ boxes. There are ___ cubes in each box.</p> 	<p>Billy draws this bar model to divide 20 between 4 equal groups. He writes <math>20 \div 4 = 5</math></p> 	<p><math>12 \div 2 = 6</math> <math>20 \div 4 = 5</math></p>
<p>Make equal groups - grouping</p>	<p>Pencils come in packs of 20 We need to put 5 in each pot How many pots will we need?</p> <p>There are ___ pencils altogether. There are ___ pencils in each pot. There are ___ pots.</p> 	<p>Mrs Green has 18 sweets. She puts 3 sweets in each bag. How many bags can she fill?</p> 	<p><math>20 \div 5 = 4</math> <math>18 \div 3 = 6</math></p>
<p>Divide by 2</p>		 <p>Children can then mark ones into each section to help.</p>	<p><math>12 \div 2 = 6</math></p>
<p>Divide by 5</p>		<p>Bar method as above with 5 sections.</p>	<p><math>20 \div 5 = 4</math></p>
<p>Divide by 10</p>		<p>Bar method as above with 10 sections</p>	<p><math>20 \div 10 = 2</math></p>



